Quentin Barnes

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Senior Software Developer / Architect

Versatile and resourceful software engineer with an extensive background working with high performance teams and leading technical projects from concept to completion. Technically oriented and collaborative with skills in communicating effectively with individuals as well as groups at all levels throughout the organization. Highly productive, creating innovative software solutions with tenacious debugging skills. Extensive experience in:

Linux/BSD/UNIX kernels • Software Development Life Cycle (SDLC) • C and C++ • ARM & x86 assembly • Simulation and logic analyzers • Performance analysis • ISO C & C++, ELF, ABI, and POSIX standards • Open Source Software development and GPL • Compilers and toolchains • Git, GitHub, and Subversion • Jenkins • gdb / crash / perf • Mentoring / Leadership

Career Highlights

- For two years as company's lead engineer, successfully defended the Linux kernel's routing cache algorithm against a patent troll (Bedrock v. Yahoo!).
- In an in-house developed Linux kernel module, found and fixed a defect costing company $100K/hour in lost revenue.
- Wrote, open-sourced, and have maintained since 2008 the kernel module and iptables plug-in for Layer 3 Direct Server Return (L3DSR) for Linux. L3DSR has reduced Yahoo!'s data centers' load balancer costs by $20MM/year.
- Designed and released radical new approach for Linux's Kernel Probes on ARM, which solved all existing multi-processor and real-time problems found in all other implementations. Gave talk at the Embedded Linux Conference on approach.
- Designed and implemented a virtual critical section method that substantially reduced locking overhead and allowed reuse of slower, cheaper hardware for new deliveries saving the company $100MM on existing contract.
- Ported to ARM and reimplemented Motorola's Real-Time Executive. The released executive never had any reported defects, which shipped for years on tens of millions of GSM phones.

Experience

Yahoo/Verizon Media, Champaign, IL   **8/2007 - 9/2020**
Linux Kernel Team
Founding member and lead engineer for Yahoo!'s and Verizon Media's Linux Kernel Team. Supported production use of internally built and released Linux kernels with team's enhancements and internally developed kernel modules and device drivers.

- Solved hundreds of production defects impacting Yahoo! servers' stability and performance.
- Evaluated CrowdStrike's falcon sensor and code read its kernel module finding 14 defects.
- Implemented open-by-file-handle service in NFS module saving data centers' filer costs.
- Developed and presented company-wide RHEL 8 features talk motivating engineers to migrate to the new version.
- Wrote paper for upper management on competitive analysis of distros for hybrid cloud use.
- Created and presented talk informing company engineers on Meltdown and Spectre vulnerabilities.
- Researched and delivered company-wide presentation with live demo on unikernel technology.
- Served as the company liaison to Red Hat support tracking and resolving production defects.

Motorola Mobile Devices, Champaign, IL   **1/1997 – 8/2007**
Chief Technology Office Software Team, 4/2003-8/2007
Member of a small team that prototyped and brought up Motorola's next generation of cell phones.

- Designed, coded, and up streamed Linux's Kernel Probes initial implementation for ARM.
- Designed new interrupt controller module to eliminate locks from kernel's interrupt handler.
- Designed new hardware timer module to improve efficiency of entering/exiting low-power state.
- Designed and coded interrupt subsystem and low-level code for Motorola's GSM phones.
- Completed prototype and bring-up of µClinux and Java VM kicking off the LinuxJava products.
- Adviser to upper management on GPLv2 and its implications on software development.
- Regularly evaluated vendors and embedded toolchains for management's consideration.
- Helped write work contract for Wasabi Systems and evaluated their compiler deliverable.
- Prototyped and demonstrated NetBSD as an alternative OS on ARM-based phone hardware.
- Active participant representing Motorola to ARM Limited in ARMv6 architecture planning discussions.
- For our sector, analyzed, reported, and tracked all compiler defects with our vendors.
- Sector-wide liaison to ARM Ltd.'s and Diab's C/C++ compiler product teams.

Simulator Team, 7/2000 - 4/2003
Enhanced MOOSE (Motorola's Object-Oriented Simulation Environment) used to accurately simulate handset devices, cell towers, and network.
- Added user-accessible hooks for monitoring critical sections of simulated code that caught serious errors.
- Added feature to measure internal performance changes of the MOOSE simulator.
- Created tool for generating TCL source code from DWARF information for tracing functions.
- Wrote and maintained web pages for developers on advanced debugging with the MOOSE simulator.
- Automated performance analysis of each new MOOSE release against baseline.

GSM Team, 1/1997 – 7/2000
Prototyped and developed embedded, low-level software for Motorola GSM handsets based on ARM and M•Core processors. Ported and reimplemented proprietary RTOS (GSM Exec) on ARM and M•Core processors.
- Designed and implemented semaphores and mutex services for GSM Exec.
- Designed interrupt subsystems for many of Mobile Devices' chipsets for several years.
- Did competitive analysis and evaluation of several vendors and their RTOS product offerings.
- Wrote and maintained web pages on compiler bugs, limitations, and tips for developers.

Motorola Computer Group, Champaign, IL   **6/1990 – 1/1997**
AIX PowerPC Team, 1/1995 - 1/1997
Solver for any software or hardware problems encountered during prototyping of new Motorola PowerPC hardware.
- Debugged and cracked the most hard-to-solve bizarre and intermittent kernel and peripheral faults.
- Liaison to Motorola's Austin PowerPC motherboard design team.

Languages and Tools Team, 6/1990 – 12/1994
Developed compiler and cross-compiler toolchains for 68K and 88K Motorola processors.
- Ported and supported USL's Cfront 3.0 and GNU's C/C++ compilers to SysVr4 and VMEexec.
- Participated in 88Open ABI/API Standards Working Group.
- Enhanced IEEE-754 compliance of kernel's Floating-Point Exception Envelope for 88K processor.
- Designed object conversion tool to rewrite machine instructions for silicon bug workaround.
- Liaison to Motorola's Austin compiler team.

Education

Bachelor of Science (BS), Computer Science, College of Engineering
University of Illinois, Urbana, IL

Papers and Presentations

- Verizon Media & RHEL 8, August 2019
- RHEL 8 Features, May 2019
- OS Strategy, August 2018
- Spectre / Meltdown Deep Dive, January 2018
- Source to RPM in 120 Minutes training class, July 2017
- NextGen Containers: Life without Kernels, January 2017
- Alternative OSes to RHEL for Production Server Use with a Focus on Ubuntu, April 2016
- Comparison of Minimal OSes for Yahoo!: RHEL Atomic, CoreOS, and a Home-grown Approach, January 2015
- A Proposal for a Change in Direction with Yahoo! Software Development and Deployment, May 2014
- Kernel Probes for ARM, April 2007
- Introduction to ISO C99 Standard, December 2005